V.S.B.ENGINEERINGCOLLEGE, KARUR
Department of Electronics and Communication Engineering
Academic Year: 2017-2018 (EVEN Semester)

Class: I Year / II Semester B.E. ECE 'A', 'B'& 'C' Sections
Name of Subject: Electron Devices
Name of Faculty member: Mrs.K.Vijayalakshmi/ C.Kannika Paramashwari/ Mr.K.krishnan

Assignment questions

1. Calculate the built in potential barrier in a PN junction.Consider a silicon PN junction at 300K with doping densities $N_A = 1*10^8$ cm^{-3} and $N_D = 1*10^{15}$ cm^{-3}.Assume $n_i = 1.5*10^{10}$ cm^{-3}

2. A PN junction diode has at a temperature of 125˚C a reverse saturation current of 30 µA. At a temperature of 125˚C find the dynamic resistance for 0.2 v bias in forward and reverse direction.

3. The h-parameter for the transistor are h_{ie} = 1.1 k, h_{fe} =99, h_{re} =$2.5*10^{-4}$ and h_{oe} = 25 µA/V. Find the h-parameter for common base and common collector configuration.

4. If a donor impurity is added to the extent of one atom per 10^8 germanium atoms, calculate its resistivity at 300˚ K. If its resistivity without addition of impurity at 300˚ k is 44.64Ω, comparing two values, comment on the result.

5. Consider a Si PN junction at T = 300˚ K with doping concentration of $N_A = 10^{16}$ cm^{-3}. Assume the $n_i = 1.5*10^{10}$ cm^{-3}. Calculate the width of the space charge region in a PN junction, when a reverse bias voltage V_R = 5 V is applied.

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Class: I Year / II Semester B.E. ECE 'A', 'B' & 'C' Sections
Name of Subject: Circuit Analysis
Name of Faculty member: Mr. C. Moorthy & Ms. P. Deepiha

Assignment questions

1. The total charge flowing out of one end of a small copper wire and into an unknown device is determined to follow the relationship $q(t) = 5e^{-t/2}$ C, where t is expressed in seconds. Calculate the current flowing into the device, taking note of the sign.
2. A voltage source delivers 4A when the load connected is 5Ω and 2A when the load is 20 Ω, what is the maximum power it can deliver, power transfer efficiency with R_L=5 Ω and power transfer efficiency when it delivers 50 W?
3. A resistor, capacitor and an inductor have a values of 20 kΩ, 12.5nF and 200mH are connected parallel with a input current of 2mA. (a) Determine the resonant frequency. (b) Solve for the input impedance Z_T=Z∠θ, of the circuit at frequencies of 0.1ω_p, 0.2ω_p, 0.5ω_p, ω_p, 2ω_p, 5ω_p and 10ω_p.
4. An RLC series circuit has R=10Ω, L=2H. What value of capacitance will make the circuit critically damped?
5. For the following system of equations,

$$100V_1 - 45V_2 + 30V_3 = 0.2$$
$$75V_1 + 80V_3 = -0.1$$
$$48V_1 + 200V_2 + 42V_3 = 0.5$$

(*a*) Write the set of equations in matrix form.

(*b*) Use *Del(*Y) to calculate V_2 only.